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Memorandum of Understanding
between the
National Aeronautics and Space Administration
of the United States of America
and the
Comision Nacional de Actividades Espaciales
of the Argentine Republic
Concerning the
Scientific Applications Satellite-C
Earth Observation Mission

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The National Aeronautics and Space Administration of the United States of America (hereinafter referred to as NASA)
and

The Comision Nacional de Actividades Espaciales of the Argentine Republic (hereinafter referred to as CONAE)

DESIRING to extend the cooperation developed between NASA and CONAE, and

CONSIDERING that cooperation on the Scientific Applications Satellite - C mission will enhance the scientific and applications value of the mission and provide mutual benefits,

HAVE AGREED as follows:

Article 1 - Objectives

1. This Memorandum of Understanding (MOU) defines the terms and conditions for cooperation between NASA and CONAE (hereinafter referred to as the Parties) within the framework of the Scientific Applications Satellite - C (hereinafter referred to as SAC-C) program, which is described in Article 2 below. This includes managerial, technical, and operational interfaces that are necessary to ensure the continuity of and compatibility between the respective activities, the roles and responsibilities of the Parties, and the legal and financial commitments of the Parties.
2. A joint United States-Argentine workshop was held in Buenos Aires in December 1993, to explore cooperative satellite efforts in civilian space science and applications. A principal objective of the workshop was to identify candidate instruments from Argentina and the United States for flight on a small cooperative Earth observing satellite designated as SAC-C. A joint NASA/CONAE report was subsequently issued that recommended four instruments be considered for this joint project. The executive committee endorsed only three of the four instrument investigations recommended by the workshop for flight on SAC-C, based on programmatic, technical and cost criteria. The endorsed instruments, described in Article 2, are the multispectral scanner, the magnetometers and the Global Positioning System (GPS).

Article 2 - Mission Description

1. The cooperation set forth in this MOU will be undertaken pursuant to the Agreement between NASA and CONAE for Cooperation in the Civil Uses of Space, signed at Buenos Aires August 6, 1991, as extended.
2. The objective of the SAC-C mission is to conduct correlated observations of the Earth of interest to United States and Argentina, which also contribute directly to the NASA Mission to Planet Earth program. SAC-C will entail the flight of an Argentine Multispectral Medium Resolution Scanner (MMRS) that will be used primarily by Argentina to monitor forest inventory in the Argentine region of Mesopotamia, predict agricultural production in the Pampean region, evaluate and elaborate maps of the Patagonian desert, monitor pollution, evaluate changes in the Chacoan forests and correlate these changes with atmospheric changes in CO₂, and examine circulation and productivity in marine coastal areas. NASA will provide a scalar magnetometer to monitor the main geomagnetic field, to map the static lithospheric magnetic anomalies, to study the ionospheric and magnetospheric current systems, and to study the lithospheric conductivity structure. In addition, NASA will provide a GPS receiver to determine the position of the spacecraft to the subdecimeter level, to provide timing control, to provide atmospheric index of refraction and estimates of atmospheric temperature and water vapor content, to obtain a global estimate of the intermediate wavelength gravity field, and to map ionospheric structure.

3. SAC-C will be launched by NASA on an expendable launch vehicle (ELV), now planned for in late 1998 or early 1999 at a time mutually agreed by the Parties. SAC-C may be comanifested on the same launch vehicle with another payload.

Article 3 - Mission Participation

- I. Consistent with the terms of this MOU, CONAE may, with NASA's agreement, invite participation in SAC-C by other countries. CONAE will utilize separate Memoranda of Understanding for this cooperation.

Article 4 - Responsibilities of CONAE

CONAE will ensure that the following responsibilities are fulfilled:

1. Design, fabricate, test, calibrate, prepare for integration and deliver to the launch site the complete SAC-C satellite suitable for deployment from an expendable launch vehicle.
2. Provide system engineering and develop jointly with NASA a SAC-C Project Implementation Plan which includes the overall system specification and an overall interface control document for the SAC-C satellite. These documents should define the NASA/CONAE interfaces including payload, ground system, and launch interfaces.
3. Establish requirements for overall system level testing, plan and conduct system level tests, evaluate results, and certify flight readiness.
4. Design, fabricate, test, calibrate, and integrate the MMRS instrument payload.
5. Integrate the NASA-provided instruments with the SAC-C spacecraft.
6. Provide NASA with relevant prelaunch data, including design, safety, and operations information and any such additional equipment and documentation as may be agreed to in the SAC-C Project Implementation Plan.
7. Provide ground support equipment and qualified personnel to support the handling and testing of SAC-C prior to and during its integration with the launch vehicle, as mutually agreed.
8. Provide NASA with all mission requirements and constraints necessary for NASA to provide launch services and satisfy NASA requirements.
9. Perform checkout, as mutually agreed, of the SAC-C spacecraft during the launch operations phase.
10. Conduct SAC-C mission operations and provide for routine tracking and data acquisition services during the operational lifetime as described in the SAC-C Project Implementation Plan.
11. Reduce and distribute in a timely manner to NASA all data from SAC-C instruments in a format and on a schedule as mutually agreed.
12. Process the data from the MMRS instruments and make them available to NASA.

13. Make available requested SAC-C data to CONAE-designated investigators in a form suitable for scientific analysis.
14. Support the Argentine-designated investigators in analyzing SAC-C data and publishing their findings.
15. Support periodic workshops and meetings for planning SAC-C activities.
16. Inform NASA promptly of any technical or programmatic problems that may affect overall SAC-C schedules, cost, or performance.

Article 5 - Responsibilities of NASA

NASA will ensure that the following responsibilities are fulfilled:

1. Support the development with CONAE of the SAC-C Project Implementation Plan.
2. Support the development of requirements for overall system level testing, the planning and performance of system level tests, the evaluation of results, and certification of flight readiness.
3. Design, fabricate, test, calibrate, and transport the NASA-provided instruments to the SAC-C spacecraft integration site and prepare such instruments for integration.
4. Support the integration of the NASA payload with the SAC-C spacecraft, including the associated test and calibration activities.
5. Provide ground support equipment and qualified personnel to support integration, test, launch, operations, and data analysis of the NASA-provided payload with the SAC-C spacecraft as described in the SAC-C Project Implementation Plan.
6. Provide suitable facilities at the launch site for spacecraft checkout and integrate the spacecraft with the launch vehicle and perform necessary tests and checkouts prior to launch.
7. Launch the SAC-C spacecraft and inject it into the agreed orbit.
8. Provide technical advice and such additional equipment and documentation as may be agreed to in the SAC-C Project Implementation Plan.
9. Provide CONAE with required design and other information pertaining to payload-satellite interfaces and on-orbit operations.
10. Provide CONAE with specifications of launch vehicle environmental conditions and safety requirements, and the specifications on the appropriate mechanical and electrical interfaces for use in preparing the SAC-C spacecraft for launch. Provide relevant technical consultation and technical data, as mutually agreed.
11. Verify compatibility of spacecraft interfaces with the launch vehicle.
12. Support CONAE in checkout, as mutually agreed, of the SAC-C spacecraft during the launch operations phase.
13. Command, monitor, and control the NASA instruments, including performing such evaluation and calibration activities as are required to verify the performance achieved on-orbit by the NASA instrumentation.

14. Provide available ground station coverage during spacecraft launch phase and on an emergency basis thereafter, as mutually agreed.
15. Process data from the NASA payload and make them available to CONAE.
16. Make available requested SAC-C data to NASA-designated investigators in a form suitable for scientific analysis.
17. Support the NASA-designated investigators in analyzing SAC-C data and publishing their findings.
18. Support periodic workshops and meetings for planning SAC-C activities.
19. Inform CONAE promptly of any technical or programmatic problems which may affect SAC-C schedules, cost, or performance.

Article 6 - Management

Each of the Parties will designate a SAC-C Project Manager who will be responsible for the overall management and implementation of the SAC-C Project. It is also the responsibility of the Project Managers to create jointly the SAC-C Project Implementation Plan under which the detailed activities outlined in this MOU will be implemented.

Article 7 - Meetings and Reviews

The Parties will participate in joint reviews to be held throughout the duration of the project including, but not limited to, critical design reviews and preship reviews as agreed in the SAC-C Project Implementation Plan.

Article 8 - Science Data and Goods Rights

1. SAC-C investigators will be selected by a coordinated Announcement of Opportunity or by means of a similar process. This Announcement of Opportunity will outline the responsibilities of investigators. The data from SAC-C will be made available as soon as possible, in any event, not to exceed 6 months from acquisition. Thereafter, the data sets will be deposited in one or more designated archives for general release to users consistent with the data policies of the Parties.
2. The results of the SAC-C mission experiments will, in addition, be made available to the scientific research community through the publications of the investigators in appropriate journals or other established channels. In the event the publications are copyrighted, the Parties shall have a royalty-free right under the copyright to reproduce and use such copyrighted work for their own purposes.

Article 9 - Technology Transfer

Each Party is obligated to transfer to the other Party only those technical data and goods necessary to fulfill its responsibilities under this agreement, subject to the following:

1. Interface, integration, and safety data (excluding detailed design, manufacturing, and processing data, and associated software) will be exchanged by the Parties under this agreement without restrictions as to use or disclosure.

2. In the event a Party finds it necessary to transfer technical data other than that specified in paragraph 1 above, in carrying out its responsibilities under this agreement that are proprietary, and for which protection is to be maintained, such technical data will be marked with a notice indicating that it shall be used and disclosed by the receiving Party and its contractors and subcontractors only for the purpose of fulfilling the receiving Party's responsibilities under this agreement and that the technical data shall not be disclosed or retransferred to any other entity without prior written permission of the furnishing Party. The receiving Party agrees to abide by the terms of this notice, and to protect any such marked technical data from unauthorized use.
3. In the event a Party finds it necessary to transfer technical data and goods in carrying out its responsibilities under this agreement that are to be protected for export control purposes, the furnishing Party shall mark with a notice or otherwise specifically identify such technical data and goods. The notice or identification shall indicate that such technical data and goods shall be used, and such technical data shall be disclosed by the receiving Party and its contractors and subcontractors only for the purpose of fulfilling the receiving Party's responsibilities under this agreement. The notice or identification shall also provide that the such technical data shall not be disclosed, and such technical data and goods shall not be retransferred to any other entity without prior written permission of the furnishing Party. The Parties agrees to abide by the terms of the notice or identification, and to protect any such marked technical data and identified goods from unauthorized use
4. There will be no obligations on a Party to protect unmarked technical data. However, all technical data and goods transferred under this agreement shall be used exclusively for the purpose of fulfilling the Parties' responsibilities under this agreement.
5. Nothing in this agreement requires the Parties to transfer technical data and goods contrary to national laws or regulations relating to export controls or control of classified data.

Article 10 - Patents and Inventions Rights

Nothing in this agreement shall be construed as granting or implying any rights to, or interest in, patents or inventions of the Parties or their contractors or subcontractors. No joint inventive activity will take place under this MOU.

Article 11 - Funding Arrangements

1. The Parties will bear the costs of discharging their respective responsibilities under this agreement, including travel and subsistence of their own personnel and transportation of all equipment for which each is responsible.
2. The financial obligations of the Parties under this agreement are subject to their respective funding procedures and to the availability of appropriated funds.

Article 12 - Public Information

Release of public information regarding this program may be made by the appropriate agency for its own portion of the program as desired and, insofar as the participation of the other is concerned, after suitable consultation.

Article 13 - Liability

1. The purpose of this Article is to establish a cross-waiver of liability between the Parties and the Parties' related entities in the interest of encouraging space exploration and investment. The cross-waiver of liability shall be broadly construed to achieve this objective.

2. For the purpose of this Article:

(a) Related Entity means:

- (i) a contractor or subcontractor of a Party at any tier;
- (ii) a user or customer of a Party at any tier; or
- (iii) a contractor or subcontractor of a user or customer of a Party at any tier.

"Contractors" and "Subcontractors" include suppliers of any kind.

(b) Damage means:

- (i) bodily injury to, or other impairment of health of, or death of, any person;
- (ii) damage to, loss of, or loss of use of any property;
- (iii) loss of revenue or profits; or
- (iv) other direct, indirect, or consequential damage.

(c) The term "launch vehicle" means an object or any part thereof intended for launch, launched from Earth, or returning to Earth which carries payloads or persons, or both.

(d) The term "payload" means all property to be flown or used on or in a launch vehicle.

(e) The term "Protected Space Operations" means all activities pursuant to this MOU, including launch vehicle activities and payload activities on Earth, in outer space; or in transit between Earth and outer space. It includes, but is not limited to:

- (i) research, design, development, test, manufacture, assembly, integration, operation, or use of launch or transfer vehicles, payloads, or instruments, as well as related support equipment and facilities and services;
- (ii) all activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services.

The term "Protected Space Operations" excludes activities on Earth which are conducted on return from space to develop further a payload's product or process for use other than for the activity in question.

3. (a) Each Party agrees to a cross-waiver of liability pursuant to which each Party waives all claims against any of the entities or persons listed in subparagraphs (i) through (iii) below based on damage arising out of Protected Space Operations. This cross-waiver shall apply only if the person, entity, or property causing the damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver shall apply to any claims for damage, whatever the legal basis for such claims, including but not limited to delict and tort (including negligence of every degree and kind) and contract, against:

- (i) the other Party;
- (ii) a related entity of the other Party;
- (iii) the employees of any of the entities identified in sub-paragraphs (i) and (ii) above.

(b) In addition, each Party shall extend the cross-waiver of liability as set forth in paragraph 3 (a) above to its own related entities by requiring them, by contract or otherwise, to agree to waive all claims against the entities or persons identified in subparagraphs 3 (a) (i) through 3 (a) (iii) above.

(c) This cross-waiver of liability shall be applicable to liability arising from the Convention on the International Liability for Damage Caused by Space Objects, of March 29, 1972, where the person, entity, or property causing the damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.

(d) Notwithstanding the other provisions of this Article, this cross-waiver of liability shall not be applicable to:

- (i) claims between a Party and its own related entity or between its own related entities;
- (ii) claims made by a natural person, his/her estate, survivors, or subrogees for bodily injury, other impairment of health or death of such natural person, except where a subrogee is one of the Parties;
- (iii) claims for damage caused by willful misconduct;
- (iv) intellectual property claims;
- (v) claims for damage resulting from a failure of the Parties to extend the cross-waiver of liability as set forth in paragraph 3 (b) or from a failure of the Parties to ensure that their related entities extend the cross-waiver of liability as set forth in paragraph 3 (b); or
- (vi) contract claims between the Parties based on the express contractual provisions.

(e) Nothing in this Article shall be construed to create the basis for a claim or suit where none would otherwise exist.

Article 14 - Registration

CONAE will take, through the Argentine Government, the necessary steps to register the SAC-C satellite and inform the Secretary General of the United Nations in a manner consistent with the Convention on Registration of Objects Launched into Outer Space on January 14, 1975.

Article 15 - Customs Clearance

Each Party shall seek to arrange free customs clearance and waiver of applicable duties and taxes for equipment and related goods necessary for the implementation of this MOU. Such arrangements shall be fully reciprocal. In the event that any customs fees and/or taxes of any kind are still levied on the equipment and related goods for implementation of this MOU, after seeking to develop the necessary free customs clearance and waiver of applicable duties and taxes, such customs fees and/or taxes shall be borne by the Party of the country levying the fees and/or taxes.

For the purpose of this MOU, each Party shall retain ownership of equipment it furnishes to the other Party. Any equipment not launched into space shall be returned upon request to the furnishing Party. In the event that any equipment launched into space is retrieved or recovered and comes into the possession of any Party, such

equipment shall also be returned upon request to the furnishing Party. Each Party shall transport its equipment to the designated delivery points, as specified in SAC-C Project Implementation Plan, and, where appropriate, from such delivery points, when the equipment is to be returned to the furnishing Party.

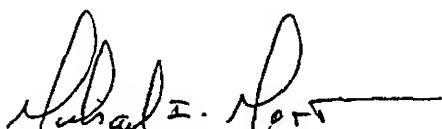
Article 16 - Amendments

This MOU may be amended by written agreement of the Parties.

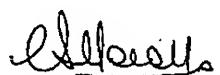
Article 17 - Entry into Force

This MOU shall enter into force upon signature and shall remain in force for the duration of the mission, which includes a period for data analysis not to exceed 3 years after termination of spacecraft operations. Either Party may terminate the MOU upon 12 months written notice.

Done at Washington, this 28 day of October 1996, in duplicate in the English and Spanish languages, both texts being equally authentic.

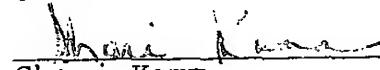


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I certify this to be a true copy
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